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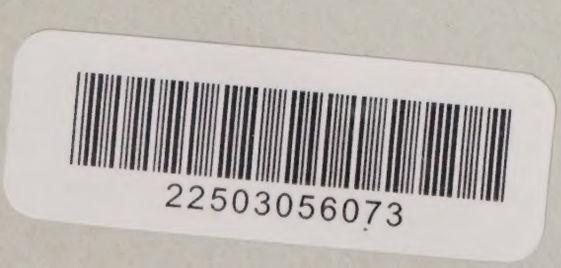
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PREFACE

The Standing Medical Advisory Committee issued a Memorandum on "The Prevention of Prematurity and the Care of the Premature Infant" in 1961 and a survey in 1968 suggested that a fresh approach was needed. Sir Wilfrid Sheldon agreed to chair an expert medical and nursing group which has now produced this authoritative and valuable report.

The report emphasizes the importance of good antenatal care, early detection of the high risk fetus and expert care during labour. It discusses the advantages of new monitoring and diagnostic techniques in the assessment of fetal growth and the early detection and management of fetal distress. There is evidence that such methods in expert hands greatly reduce the risk of sequelae of the perinatal period which would result in handicaps in later life. Evidence available from Newcastle upon Tyne, London and abroad suggests that modern intensive special care for very low birth weight babies and those with severe respiratory problems not only further reduces perinatal mortality but also reduces the mental and physical handicap rate among survivors.

A well-organized and co-ordinated special care area service based on the general hospital with full participation of hospital, general practitioner and local health authority staff is suggested. Sufficient trained medical and nursing staff are essential and the report draws special attention to the unsatisfactory situation of the single-handed paediatrician in regard to special care work. The number of consultants in paediatrics must clearly be increased to meet this need and experience in well staffed special care nurseries is needed in their training, though the recommendations relating to junior staffing may not prove to be practicable in their present form, in relation to developments in the career structure in hospital medical practice as a whole. The need for further research gets prominence in the report and it is suggested that the time is now right to review each perinatal death on the pattern of the Confidential Enquiries into Maternal Deaths.

The perinatal mortality rate in England still compares unfavourably with some other countries and preventable mental and physical handicaps in babies occur too frequently. This report suggests ways in which that record can be improved and merits study by all concerned with the care of babies and the maternity services.

On behalf of the Department and of all those who will benefit from reading this report I express our thanks to Sir Wilfrid and his colleagues for a most valuable contribution to the health services for children in Britain.

G. E. GODBER,

Chief Medical Officer.

EXPERT GROUP ON SPECIAL CARE FOR BABIES:

1. A group of experts was asked in 1969 by the Chief Medical Officer to consider special care for babies. The terms of reference were:

"To consider the needs of newborn infants requiring special care, the anticipation and prevention of such needs, the organisation of facilities, and to make recommendations."

2. The group met on 11 occasions from 19 June 1969 to 5 November 1970.

3. The membership was:

Chairman—Sir Wilfrid Sheldon, K.C.V.O., M.D., F.R.C.P.—Consultant Adviser in Paediatrics.

E. A. J. Alment, Esq., M.R.C.S., L.R.C.P., F.R.C.O.G.—Consultant Obstetrician and Gynaecologist, Northampton.

J. P. Bound, Esq., M.D., M.R.C.P., D.C.H.—Consultant Paediatrician, Blackpool.

Moira Campbell, S.R.N., R.S.C.N.—Special Care Babies' Unit, City of London Maternity Hospital.

Sheila T. Davy, M.T.D.—Matron, Sorrento Maternity Hospital, Birmingham.

G. D. Duncan, Esq., M.B., Ch.B., D.P.H.—Senior Administrative Medical Officer, East Anglian Regional Hospital Board.

R. M. Forrester, Esq., M.D., F.R.C.P., D.C.H.—Consultant Paediatrician, Wigan.

Professor P. J. Huntingford, M.D., F.R.C.O.G.—Professor of Obstetrics and Gynaecology, St. Mary's Hospital Medical School, London.

G. A. Neligan, Esq., D.M., F.R.C.P.—Reader in Child Health, University of Newcastle.

P. O'Brien, Esq., M.D., F.R.C.G.P.—General Practitioner, Warrington.

D. T. Pearson, Esq., B.S., M.R.C.P., F.F.A.R.C.S.—Consultant Anaesthetist, Newcastle Regional Cardiothoracic Service.

E. O. R. Reynolds, Esq., B.SC., M.D., M.R.C.P., D.C.H.—Senior Lecturer and Hon. Consultant in Paediatrics, University College Hospital.

Professor J. P. M. Tizard, M.A., B.M., B.Ch., F.R.C.P., D.C.H.—Professor of Paediatrics, Hammersmith Hospital.

W. Turner, Esq., LI.B., M.B., Ch.B., D.P.H.—Medical Officer of Health, Bradford.

*J. W. Scopes, Esq., M.B., M.R.C.P., Ph.D., D.C.H.—Reader in Paediatrics, Hammersmith Hospital.

Eileen Ring, M.D.
†Mary Boyle } Joint Secretaries—from May 1970

4. The group was shocked by the unexpected death of Dr. Frank Riley in April, 1970, and they wish to put on record their appreciation of his work as Medical Secretary.

* Deputised for Professor Tizard at some of the meetings of the Expert Group.
† Mr. E. Bidgood and Mr. P. Dawson-Bowling acted as secretaries for short periods.

1. INTRODUCTION

1.1. The Report on Special Care for Babies traces the evolution of the present day service, whose objectives are to save infant life and to prevent mental and physical handicap among surviving babies.

1.2. Low birth weight may be the consequence of a short gestation or follow slow growth of the fetus; this distinction led to a recognition that the international definition of "prematurity" had certain limitations. The term has been dropped as a result and the expression low birth weight is now used.

At the Second European Congress of Perinatal Medicine an informal working party of obstetricians and paediatricians from thirteen European countries made certain suggestions about the nomenclature of birth weight and gestational age (Appendix 6).

1.3. The report draws attention to how much has recently become known about the development and physiology of the fetus and the early detection and management of fetal distress in which new monitoring, diagnostic and other techniques have played a significant role. Close liaison between the obstetric and paediatric teams is essential for the advancement of fetal medicine.

1.4. The special care service for babies has expanded and changed. Intensive care has been introduced in some existing special care nurseries and this is essential for progress in the management of certain categories of babies, such as those of very low birth weight and those with severe respiratory problems whose healthy survival depends upon very specialized care. Preliminary reports, (Stahlman, 1969; Neligan and Steiner, 1970; Rawlings and others, 1970) suggest not only that more children will survive, but that the proportion of survivors who are handicapped will fall.

1.5. The report recommends that babies can best be given special care in two types of nursery, the special care nursery and the combined special care and intensive care nursery. Special care nurseries would be associated with maternity departments at district general hospital level. Combined special care and intensive care nurseries would be relatively few in number. They would be associated with certain maternity departments of general hospitals that would have substantial resources in staff and equipment for the intensive study of the fetus. It is not suggested that there could or should be a precise distinction between the function of special care nurseries and those providing combined special care and intensive care. To avoid a cumbersome title, the remainder of the report assumes that a nursery providing intensive care would also function as a special care nursery.

2. BRIEF HISTORICAL REVIEW

2.1. Although the importance of special care for certain newborn babies has been emphasized for many years, interest in these babies and provision for their effective management has grown comparatively recently. There was a practical advance in 1902 with the establishment of the Central Midwives Board to regulate the training, registration and practice of midwives. The care of the newborn baby was included in the training syllabus.

2.2. In 1931 a unit for the care of "premature" infants was opened in the Sorrento Maternity Hospital, Birmingham, under Dr. V. Mary Crosse whose book "The Premature Baby" was first published in 1945. She found the main

problems at that time were infection and body temperature control, and to counter these a scheme was devised of meticulous nursing care using simple equipment. A home care service for selected "premature" babies supplemented the work of the hospital unit. The principles of care in the Sorrento Unit were widely adopted in this and other countries.

2.3. A report by the British Paediatric Association on requirements for premature infants was produced in 1943. Circular 20/44 on "The Care of the Premature Infant" was issued by the Ministry of Health in 1944. In the same year statistics were collected for the first time for "premature" babies in that the certificates notifying birth also recorded the baby's weight. Table A1.1 of Appendix 1 gives details obtained from this source since 1953. In 1950 the WHO Expert Group on Prematurity defined a "premature" infant as one born alive with a birth weight of 2,500 g (5½ lbs) or less. The definition did not make any distinction between infants below the expected weight for a given period of gestation and those born after a short period of gestation. In 1961 WHO recommended that those previously described as "premature" should be called low birth weight babies.

2·4. In 1949 a report on "Neonatal Mortality and Morbidity" by a Joint Committee of the Royal College of Obstetricians and Gynaecologists and the British Paediatric Association drew attention to the importance of "prematurity" as a cause of death and morbidity in the neonatal period. In England and Wales stillbirths were registered from 1926 onwards, and the causes of stillbirths began to be registered in 1960.

2·5. In 1961 a memorandum on the "Prevention of Prematurity and the Care of Premature Infants" was produced by a Joint Sub-Committee of the Standing Medical Advisory Committee and the Standing Maternity and Midwifery Advisory Committee. This made recommendations for a comprehensive programme of care for "premature" babies. It emphasized the importance of regular and thorough antenatal supervision for all pregnant women, of carefully selecting patients for hospital confinement and of having enough antenatal beds. It recommended the establishment of special care nurseries in the larger maternity units not only for "premature" babies but for other newborn babies requiring special care. It was thought that these could also provide a service for small maternity units and the domiciliary midwifery service in the area, and serve as a base for emergency resuscitation teams to support the peripheral service. The medical responsibility for special care nurseries was considered to be the duty of a consultant paediatrician working closely with the consultant obstetric staff. Recommendations were made on cot needs and the size of nurseries, while guidance on planning, nurse staffing, aftercare and follow-up was also given.

2·6. In 1958, a memorandum on "Haemolytic Disease of the Newborn", which has been issued by the Standing Medical Advisory Committee, stated that over 300 infant deaths and some 400–500 stillbirths occurred annually from this condition. It recommended that babies suffering from haemolytic disease of the newborn should be collected together and cared for in special centres which in practice would be special care nurseries attached to large consultant maternity departments.

2·7. During the past 10 years there have been important advances, many of them highly technical, in the care of low birth weight and sick newborn babies. The results obtained in specially staffed and equipped nurseries both in the United

Kingdom and elsewhere suggest that modern care not only saves infant lives, but also improves their chances of developing normally. It is therefore timely to review the present arrangements for the management of babies requiring special care and to consider how best to organize them in the future.

3. THE IMPORTANCE OF SPECIAL CARE

Effect on mortality

3·1. Between 1906–1910 and 1969 the infant mortality rate in England and Wales fell by more than four-fifths, i.e. from 117 per 1,000 to 18 per 1,000. In the same time there was a decline of over 90% in the mortality of infants who survived the first week of life, but the number of first week deaths fell by only 55%. Whereas in 1906–1910 first week deaths accounted for 20% of all infant deaths, in 1969 60% of all infant deaths occurred in the first week (Appendix 1 Table A1·2). In fact more deaths occur in the first week of life than during the next five years. First day deaths have remained the most resistant to improvement of all infant deaths and account for one-third of the infant mortality rate.

3·2. The perinatal mortality rate is a term that is used internationally for the sum of stillbirths and first week deaths; it is expressed as a rate per 1,000 live and stillbirths (Appendix 1 Tables A1·3 and A1·4). It is an index of the quality of care given to the mother and baby before and during birth and to the infant in the first week of life. It is often a matter of chance whether a fetus having serious anatomical or physiological disturbances is born dead or dies soon after birth and therefore it is desirable to study stillbirths and first week deaths as a single problem. At present there are 19,000 perinatal deaths each year in England and Wales. They amount to less than 3% of all births but they account for over 80% of the total loss of infant life from the twenty-eighth week of pregnancy to the end of the first year of life. Appendix 1 Table A1·5 shows the marked regional and seasonal variation which can occur in perinatal mortality rates.

3·3. Any scheme for the special care for babies must take account of the factors causing perinatal mortality and morbidity. The causes of perinatal morbidity are multiple and their interaction complex. The 1958 Perinatal Mortality Survey of the National Birthday Trust Fund* provided some useful information. It gave the result of post-mortem examinations that were carried out on 2,188 of the 2,358 perinatal deaths in March 1958. Intrapartum anoxia was the commonest cause of perinatal death; most of these babies were otherwise normal and over half of them were born at or after the thirty-eighth week of gestation. One in eight was born alive but failed to survive. Intrapartum anoxia, with or without cerebral birth trauma, was responsible for about one in three of all perinatal deaths. Congenital malformations were responsible for 19% of deaths. Hyaline membrane disease, pneumonia and iso-immunization were also important causes.

3·4. The antepartum and intrapartum causes of infant deaths are detailed in Appendix 1 Table A1·6, which demonstrates the major role played by "immaturity".

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*The National Birthday Trust Fund and the Royal College of Obstetricians and Gynaecologists made a further survey of British Births during the week April 5–11, 1970. This included all babies born alive or dead after the 24th week of gestation. The results were not available when this report was written.

3·5. Increased knowledge of the physiology of pregnancy and of the development and physiology of the fetus can contribute to a reduction of perinatal mortality and morbidity, (Cross and Dawes, 1966; Dawes, 1968). New diagnostic techniques enable a more precise diagnosis of fetal hypoxia than has been possible up to now (Weingold, 1968; Huntingford and others, 1969, 1971). It is essential to identify early in pregnancy those women whose babies are likely to have a higher than average risk of perinatal death or morbidity so that arrangements can be made for their special care throughout pregnancy and during labour.

3·6. There is evidence that neonatal mortality can be reduced by the introduction of modern special care facilities for newborn babies. Usher (1970) pointed out that a number of nurseries have been operating for several years with adequate microchemistry and blood gas laboratory, respiratory and monitoring facilities, and a full-time medical staff for neonatal care. He quoted a study of mortality rates among 61,738 infants related to the hospital facilities available for neonatal care in the Province of Quebec in 1967 (Appendix 2). The incidence of low birth weight was about the same in the four groups of hospitals examined. The neonatal mortality rate was lowest in the group having intramural intensive care facilities. Stahlman (1969) also showed that there was a reduction in neonatal mortality, particularly among low birth weight babies, after the introduction of special care facilities to a nursery for newborn children in the U.S.A. (Appendix 7).

Effect on preventing handicap

3·7. In the past a high proportion of the smallest surviving low birth weight babies had neurological or developmental anomalies in later life (Drillien, 1967). Attention is now being focussed not only on saving lives but also on the prevention of handicaps. Thus measures to reduce the handicap rate among surviving babies may be judged as important as any further reduction in the perinatal mortality rate.

3·8. Neligan (1970) drew attention to the need to ensure as far as possible that each child is born at his optimum stage of development into a postnatal environment which will help him to overcome the hazards of physiological and nutritional adjustments. He emphasized the need to assess the gestational age and well-being of the fetus, the importance of using modern methods of resuscitation, and the crucial significance of detecting biochemical disorders during the neonatal period. Such measures would prevent, so far as present knowledge allows, sequelae of the perinatal period which result in handicaps in later life.

3·9. With the improved recognition and prevention of factors known to cause mental or physical handicap, for example hypoxia, hypoglycaemia and hyperbilirubinaemia, further development of special care facilities should be accompanied by a reduction in the numbers of babies surviving with mental and physical handicaps. The efficacy of special care and the justification of the effort it demands in terms of staff, special training and facilities should be judged by a falling handicap rate among surviving babies. Conclusive evidence that this aim can be achieved will take some time to accumulate, since it depends upon the follow-up of the survivors of the first month of life to an age when reliable methods of assessment can be applied. Encouraging results are

being found in hospitals which are attempting to use modern methods of special care for particularly vulnerable groups of babies.

3·10. Several recent preliminary follow-up studies suggest a more favourable outcome than that reported by Drillien (1967) for 112 Edinburgh children with a birth weight of 1,360 g (3 lb) or less. She compared those born during 1955–60 with those born during 1948–52 and found that improvement in the survival rate, from 17% in the earlier period to 30% in the later period, had been achieved at the expense of an increase in the proportion of handicapped among the survivors to school age from 32% to 56%. By contrast, a current follow-up study of the survivors in the same very low birth weight group born in Newcastle upon Tyne during 1961–69, when 29% of those born alive survived, has found only 20% of possibly or certainly handicapped children among the 44 survivors followed to a mean age of 4·4 years at the time of writing. More details appear in Appendix 3, where equally encouraging results are summarised concerning the survivors of other severe perinatal hazards.

3·11. Rawlings and others (1971) have also produced preliminary evidence to suggest that modern intensive care of low birth weight babies can improve survival rates and reduce handicaps among survivors. During the years 1966–1969, 149 babies weighing 1,500 g (3 lbs 4 oz) or less were admitted to the special care nursery of University College Hospital, London. Eighty babies, or 53%, survived for more than 28 days and a further eight babies died before the age of 2 years leaving 72 surviving babies. Sixty-seven babies out of the 72 survivors are being followed-up. Appendix 4 shows that 58 babies or 87% of the 67 babies are regarded as having normal mental and physical development. Stahlman (1969) has reported that the developmental quotients of 46 infants who had survived severe respiratory illnesses requiring full-scale modern intensive care, including the use of mechanical ventilation, were no different from those of their unaffected siblings.

4. PRESENT FACILITIES FOR SPECIAL CARE BABIES

4·1. Table A1·7A of Appendix 1 shows the provision of special care cots in the various hospital regions in 1969 related to livebirths. Table A1.7B of Appendix 1 analyses special care nurseries in each hospital region according to the number of allocated cots. It shows that many of the nurseries are small, nearly two-fifths having less than ten cots.

4·2. A survey of a limited number of special care nurseries which was carried out from the Department in 1968 demonstrated great variation in provision, practice, thought and attitudes. Provision varied from a number of incubators and cots standing at one side of a normal nursery, and used by normal babies when not otherwise required, through the single room annexe to a ward nursery, to the highly developed, well-equipped, purpose-built or adapted nurseries in some of which highly specialized work was performed. The staffing of nurseries by nurses and doctors was equally varied.

4·3. Variation in practice depended, in part, on the facilities available, the nursing situation in the maternity department and on personal views which were conditioned by the local provision. The survey confirmed that there were deficiencies which required correction.

4·4. The Group sought further information from a number of representative special care nurseries about their practice, the types of baby admitted for

special care and their length of stay. This again showed wide variation. Low birth weight babies (2,500 g or less) provided the largest element of the work. Some 88% of low birth weight babies born in hospital spend some time in the special care unit with an average length of stay of 19·1 days. Babies in the "other" category included many clinical conditions listed in Appendix 9—Annexe 5 Table A.9.6 and given in more detail in paragraph 4·5. Although there were wide variations in the length of stay of infants in the various groups, the overall average length of stay was 8·5 days.

4·5. Excluding low birth weight babies, other babies admitted for special care to the nurseries reviewed included: haemolytic disease due to rhesus or other blood group incompatibility; congenital defect; short gestation but over 2,500 g; birth asphyxia; birth injury; cerebral oedema; irritation; convulsions; hypocalcaemia; hypomagnesaemia; hypoglycaemia; respiratory difficulties; perinatal infection; haemorrhagic disease; jaundice; meconium aspiration; feeding or management problems following caesarean section, forceps or breech deliveries; maternal diabetes; pre-eclamptic toxaemia; antepartum haemorrhage; social—for example illegitimate babies (Appendix 9—Annexe 5 Table A9.6).

4·6. Babies born in the associated specialist maternity departments accounted for 90% of all special care babies; 10% were admitted from small peripheral hospitals or from domiciliary practice.

5. FUTURE ORGANIZATION OF SPECIAL CARE FOR BABIES

5·1. A special care service for newborn babies should enable situations and conditions which might be damaging to the baby to be anticipated and prevented, allow specialized observation and treatment for newborn babies, provide teaching and training for professional staff and follow-up and research. A special care service for babies should be so organized that hospital, general practitioner and local authority services all play a full part on the lines of an integrated service recommended by the Report on Domiciliary Midwifery and Maternity Bed Needs (1970).

5·2. The concept of the general hospital incorporating the specialist maternity department and the children's department for the district is well-established, and it is only here that a special care service should be based. An increasing number of women have their babies in hospital although domiciliary deliveries are likely to continue on a small scale. The problem of a major obstetric unit remaining in isolation from a general hospital is considered in paragraph 7·5.

5·3. The responsibility for a special care service lies primarily with the consultant paediatrician and his staff but at all stages co-operation with the obstetric team and members of other disciplines is essential. Co-operation in the antenatal period enables disorders to be anticipated and prevented, and similarly at the time of delivery it helps prevention and primary treatment.

5·4. **Anticipation and Prevention.** This is the concern of those responsible for antenatal care and consists of two main elements. Firstly there is the selection by the general practitioner of mothers who will need special care and therefore confinement in an appropriate hospital, and secondly there is specialist antenatal management of the various situations which signal danger for the infant.

5·5. The best setting for efficient anticipation and prevention of complications is a well-integrated district obstetric service where general practitioners, consultant obstetricians and hospital and domiciliary midwives work as a team. The

local maternity liaison committees commended by the Peel Report (1970) are in a key position to formulate an agreed plan of action; in some areas they are not as active as they should be. Some of them have prepared a list of vulnerable groups of women for the guidance of the obstetric team and a list in use in one area is reproduced in Appendix 5. Such lists should be regarded as indications for obtaining consultant advice rather than necessarily for hospital booking with a consultant. They should take social as well as medical factors into account. Anticipation of complications allows the baby to be conveyed in the most effective way—in utero—to an appropriate hospital which will enable mother and baby to be nursed in the same place. The responsibility for the identification of potential adverse situations and for initiating action is likely to fall to the general practitioner obstetrician. He should not be at a financial disadvantage on account of seeking consultant help for his booked patient.

5·6. The close co-operation between consultant obstetrician and consultant paediatrician, to which reference has already been made, is necessary for the antenatal consultation and the management of complications. This applies not only to suspected rhesus incompatibility, but also for example, to the detection of retarded fetal growth, diabetic pregnancies, severe pre-eclamptic toxaemia, and whenever there is a likelihood of some defect in the baby's development. If women whose babies are at increased risk during pregnancy are grouped together, effective management by obstetrician and paediatrician will be easier.

5·7. **Delivery and resuscitation of the baby.** Obstetric, midwifery, anaesthetic and paediatric staff may be involved at delivery. Apart from the importance of identifying distress at an early stage the main essential at this time is to provide for the effective resuscitation of the apnoeic baby. Ideally an experienced member of the paediatric team should be present when difficulties are likely, or summoned speedily where difficulties occur without warning. Present staffing and the physical disposition of some maternity departments may not allow this ideal to be realized. The individual on the spot who is best qualified should be responsible for the vital process of resuscitation. When paediatric attendance is not practicable, a member of the obstetric team may be involved, or an anaesthetist, or a midwife trained in resuscitation. Anaesthetists' skills are particularly relevant to resuscitation although there may be difficulties when both baby and mother require care. After resuscitation the paediatric team should take over.

5·8. Because this kind of variation is likely to continue, it is important to provide effective training for all those likely to need it. For example, if the paediatric staff are responsible for neonatal endotracheal resuscitation in any particular hospital then the obstetricians and anaesthetists in training should also have opportunity to become proficient in neonatal intubation, so that they may not be at a disadvantage if they find that this is their responsibility in later appointments. It is also important that midwives should be trained in resuscitation.

5·9. The procedures for resuscitation must be clearly understood by those who may need to use them. Written instructions are important; these should detail individual responsibilities and be issued to all concerned.

5·10. **Neonatal examination.** Medical examination of the infant in the neonatal period is widely accepted as a paediatric responsibility. For those babies whose need for special care has not been anticipated the immediate postnatal examination by obstetrician, general practitioner or midwife may reveal the

need for transfer to the special care nursery. Each hospital should ensure that there is no doubt where responsibility lies for the examination after birth and specify that the examiner can look to the consultant paediatrician for guidance and help.

5·11. **Special care nurseries.** These nurseries should provide a level of care for newborn babies that cannot be obtained elsewhere. Some babies will be admitted just for observation, some will be of low birth weight, whilst others will be mature and suffering from a variety of conditions. Most of them will also require special investigation and treatment, for example, maintenance of temperature and suitable feeding regimens.

5·12. **Intensive care nurseries.** Intensive care has evolved as an extension of the principle of special care and this function has developed in some special care nurseries associated with certain maternity departments. As well as providing the sort of care described in paragraph 5·11 they look after a small number of babies whose healthy survival depends on highly specialized techniques including the use of monitoring equipment and mechanical ventilation, e.g. very small babies of 1,500 g and less, babies with severe haemolytic disease and those with severe respiratory problems. The facilities required for the proper management of such babies should be regarded as analogous to those needed for the care of adults with coronary artery occlusion. These nurseries should have substantial numbers of medical, nursing and supporting staff, specialized equipment and resources beyond those available in every general hospital.

5·13. If intensive care work is concentrated in certain nurseries it will enable staff to get the kind of experience needed for this highly specialized work so that they can become expert in a way which may not be possible if they only use their skills infrequently. Nurseries with an intensive care function provide opportunities for research into new techniques and they should be a source of advice to all those concerned with the special care of babies.

5·14. In some hospitals it may be an advantage to combine intensive care nursery work with the neonatal surgical unit (see also paragraph 8·1).

5·15. In some instances it may be possible to predict at a varying time before delivery that intensive care as opposed to special care may be needed by the baby. Such mothers should then have their antenatal supervision and delivery in the specialist maternity department associated with the nursery providing intensive care.

5·16. **Preserving links between the mother and her baby.** A number of babies will be admitted to nurseries providing intensive care from peripheral special care nurseries, from maternity departments or from their home. It is important to maintain the links between the mother and her baby and to arrange for the mother if she wishes, to receive postnatal care in the hospital to which her baby has been transferred.

5·17. **Transport.** The baby at risk travels best in utero. When difficulty can be anticipated, delivery should be at a maternity department with an associated special care unit which can deal with the baby. On the other hand emergency situations will arise remote from special care provision, e.g. in domiciliary practice and isolated maternity units, which call for transport of the baby. In addition severely ill babies may need to be taken from special care nurseries to those providing intensive care facilities.

5·18. The main problems in transporting these babies whether they travel by

ambulance or car, are the control of environmental temperature, humidity and oxygen level. The vehicle must be adequately heated and lighted. There must be portable incubators, oxygen and suitable suction apparatus. It is important to bear in mind the possibility of having to deal with twins. Babies must be warmly wrapped. Impressive results have been obtained by the use of insulated clothing and the use of the "silver swaddler" may be helpful. Wherever practicable the baby should be accompanied by a midwife or doctor and there should be a suitable emergency drug pack available (Storrs and Taylor, 1970).

5·19. When the need for intensive care is recognized, the nursery providing this care should be responsible for making the arrangements for transfer, for providing the appropriate specialist equipment and staff and for giving guidance to the ambulance service on the principles involved. Particular problems arise in connection with respiratory difficulties, and resuscitative procedures may have to be carried out during the journey. An experienced doctor and/or midwife must accompany the baby so that respiratory emergencies can be dealt with by prompt resuscitation and that restorative treatment e.g. intubation can be undertaken. Restorative treatment, when required, should preferably be given before the journey begins. A combined portable incubator and ventilator may be helpful.

5·20. Specially designed ambulances for transferring the babies who require intensive care are available in one or two areas but as yet there is too little information to form an opinion of their value.

5·21. **Medical records and exchange of clinical information.** Babies requiring special care should have individual case records which should bear the mother's case registration number. At present these vary in detail and layout, but generally include a special history sheet with antenatal and birth data, charts for fluid or oxygen therapy, feeds, weight, etc. Current progress towards the standardization of medical records will assist data processing, record linkage, etc. and hence patient management, but the design of forms will need to be flexible so that new methods of care and investigation can be recorded. The Advisory Committee on Hospital Medical Records should be asked to consider records for special care babies.

5·22. The history is of vital importance in the clinical management of the baby newly admitted to a special care nursery. The receiving nursery should make available to those who are likely to call on its services a short and simple proforma to be completed in advance and to accompany the baby to be admitted.

5·23. It is important that there should be prompt communication between the nursery in which the baby receives special care and those responsible for care in the community. Copies of discharge notes should be sent not only to the general practitioner but also to the Medical Officer of Health, who should be aware that they are joint recipients. The discharge note will then make a better contribution towards continuing assessment, treatment and follow-up. A copy of the discharge note should also be filed with the mother's obstetric record.

5·24. The diagnostic information available from the records in each nursery should allow a comparative analysis of the work of special care nurseries. This creates a valuable opportunity to get information on the range of work in the nurseries including variation between them.

5·25. **Laboratory support.** Effective laboratory support is essential to special care work at all levels. The local provision of pathological services must be responsive to the level of work in any particular special care nursery and the

general pathology department of the hospital, which must be capable of using micromethods, will cater for its needs. A 24 hour service must be provided.

5·26. In intensive care nurseries results may be needed rapidly, and blood gas analyses are best done in a laboratory within the nursery. Other estimations, for example bilirubin and blood sugar, can be carried out in the general laboratory.

5·27. Similar laboratory needs exist in obstetric care. The work of the staff and the use made of facilities should be co-ordinated between obstetric and intensive baby care. Facilities for blood gas analysis could be shared between the maternity department and the nursery providing intensive care.

5·28. **The place of observation.** All special care nurseries will have a proportion of babies who have been admitted primarily for a period of observation because of their antenatal or perinatal history. The extent to which this observation function currently lies with the special care nursery varies from place to place, depending upon professional views, available accommodation and the level of nurse staffing in the maternity department.

5·29. Some facilities for observation are necessary in the smaller maternity units without formal special care arrangements. Arrangements necessary to ensure the effective observation of individual babies must be determined by circumstances in the unit.

5·30. **Follow-up.** It is essential that arrangements should be made in each area for the systematic follow-up of a significant proportion of babies who have received special care and whose progress needs to be watched. This is primarily a matter for consultation with the Medical Officer of Health and his staff together with the general practitioners. Routine follow-up is being made easier through the growing practice of attaching health visitors to group practices.

5·31. As a measure of achievement, progress and quality of care, it is desirable that regular reviews be made of perinatal mortality and morbidity. Such reviews could be based on the work of special care nurseries. All those involved in the care of the pregnant woman and her baby should participate. Such perinatal medical conferences also provide an opportunity for continuing education.

5·32. The Group is also of the opinion that the time is now right to consider examining perinatal deaths on the general lines of the Confidential Enquiries into Maternal Deaths so that avoidable factors can be defined. By this means it should be possible to delineate more precisely those groups of women whose babies are at special risk during pregnancy, labour and immediately after birth.

6. RESEARCH

6·1. In recent years research into fetal and neonatal physiology and pathology has expanded fast and British investigators have been prominent in this field. The formation of scientific bodies such as the Neonatal Society in Great Britain and the European Society for Perinatal Medicine bear witness to the growing interest in perinatal problems.

6·2. Perinatal mortality and morbidity are largely concentrated in low birth weight babies. It is obvious that the prevention of low birth weight will ultimately prove more rewarding than the prevention or treatment of conditions to which low birth weight babies are susceptible. Low birth weight

babies comprise those who are born before term or who have suffered intra-uterine growth failure or both. In recent years greater advances have been made in understanding the causes of intra-uterine growth failure than the causes of pre-term birth. Moreover, even if intra-uterine growth failure cannot easily be prevented, mortality from this condition is likely to be reduced since the major cause of death is intrapartum asphyxia, and modern methods of fetal monitoring facilitate diagnosis and treatment.

6·3. Advances have been made in the prevention and treatment of hyaline membrane disease but not as yet in the prevention or treatment of intraventricular haemorrhage, the other main cause of death in babies born well before term.

6·4. There is still so much to be learned about illness in newborn babies that research and clinical care go hand in hand, and much of what is learned by research methods can be applied with immediate benefit to individual ill newborn babies. There are therefore obvious advantages in combining intensive care nurseries with perinatal research units where obstetricians and paediatricians can collaborate in research as well as in clinical care of the fetus and newborn.

7. STAFFING OF SPECIAL CARE NURSERIES

Medical staffing

7·1. For medical staffing to be satisfactory one or other type of special care nursery should be provided *only* in district general hospitals which have specialist maternity and children's departments, and where there are at least two consultant paediatricians. Although its siting should be related to the maternity department, for medical staffing purposes the special care nursery should form an integral part of the children's department of the hospital.

7·2. Decisions on the right scale of medical staffing need to take account of training and of the importance of having appropriate special training posts for future developments in neonatal medicine. The primary care of the neonate is the responsibility of the consultant paediatrician who should have experience in neonatal paediatrics during his training. Senior registrars should have held a resident post providing experience in neonatal work. If neonatal medicine emerges as a separate sub-specialty of paediatrics, as it well may, it will call for the creation of suitable training posts for consultants in neonatal paediatrics.

7·3. *Special care nurseries.* The primary duty of one of the resident paediatric staff from the children's department should be the care of the neonate.

7·4. *Intensive care nurseries.* These nurseries have special responsibilities for training staff in neonatal paediatrics and for undertaking special research projects. As in the special care nursery the medical staff should be part of the children's department, but more of them are needed and greater specialization is necessary. Two or more consultant paediatricians should be available. Staff at registrar level should be experienced. There should be three resident medical staff engaged solely in neonatal work, plus an additional resident attached to the sick children's wards of the department, who would be available for cover. These

residents should have held a post in a children's department. This level of staffing allows for the provision of medical escort for babies on their way to the nursery.

7·5. Some special care nurseries are remote from the children's department. Future planning should be directed to eliminate this situation.

7·6. The position of the single-handed consultant paediatrician is extremely unsatisfactory with particular reference to his work in special care. It is strongly recommended that this situation is remedied as a matter of urgency. The numbers of current paediatric staff of all grades from consultant paediatricians to house officers are given in Appendix 8. Neligan (1969) showed that of some 30 consultant paediatricians in the Birmingham and Newcastle Hospital Regions who were interviewed about their work loads in 1967–68, more than half were single-handed.

Nurse staffing

7·7. In general, nurse staffing allocation will be related to the type of care provided in the nursery, the level of activity depending upon the nursing skills available. It is important that a special care nursery should not be required to undertake intensive care without the recommended numbers and grades of nursing staff being available.

7·8. Experience is the most important qualification for staffing special care nurseries. Courses of training in special care vary in length from three to six months, but after two months' work under supervision a nurse can normally be regarded as proficient in most procedures. "Experience" is therefore defined as two months' work under supervision, and is used in this sense in the following paragraphs.

7·9. The nurse in overall charge of a special care nursery should be a registered nurse (S.R.N. or R.S.C.N.) or midwife, and in particular she should be trained in special care work. At all times there should be a nurse in charge of the nursery who is experienced in special care. Two experienced nurses able to resuscitate by bag and mask or by endotracheal intubation should be on duty in each shift, bearing in mind that either a doctor or experienced nurse should be available to accompany a baby to be admitted or transferred.

7·10. In nurseries giving special care the range of activity may extend from simple observation to complicated nursing procedures. Because of the wide variation of activity between nurseries, nurse staffing ratios should be flexible, ranging between 1 to 1·5 nurses per cot. In the case of combined special care and intensive care nurseries, a ratio of 3 nurses per cot is recommended for intensive care cots.

7·11. As an allocation of 4·5 nurses is required to keep one nurse on duty, it is necessary for at least 9 experienced nurses to be allocated to a special care nursery if 2 experienced nurses are to be on duty each shift. The recommended ratio of experienced to other staff for the special care nursery is 3 experienced nurses to 5 others, such as trainees of less than two months' experience. Small nurseries require special staffing consideration and for these the ratio of experienced to other staff might need to be increased. For nurseries providing intensive care the recommended ratio is 3 experienced to 1 other for intensive care cots.

7·12. As examples, the following calculations have been made for a nursery of 24 cots on the basis of these recommendations:

EXAMPLE 1
Nurseries of 24 special care cots without intensive care
Ratio 1 nurse per 1 cot (3 experienced: 5 others) = 24 staff (9 experienced + 15 others)
Ratio 1·5 nurses per 1 cot (3 experienced: 5 others) = 36 staff (13·5 experienced + 22·5 others)

EXAMPLE II
Nursery of 24 special care cots, including 8 for intensive care
16 cots for special care
Ratio 1 nurse per 1 cot (3 experienced: 5 others) = 16 staff (6 experienced + 10 others)
8 cots for intensive care
Ratio 3 nurses per 1 cot (3 experienced: 1 other) = 24 staff (18 experienced + 6 others)
TOTAL = 40 staff (24 experienced + 16 others)

7·13. Monitoring equipment can make an important contribution to the effective use of nursing staff, although some more advanced techniques demand more nurse training and time.
7·14. Delegation of non-nursing duties is particularly important in special care nurseries. For this reason a ward clerk should be provided. Further delegation of non-nursing duties has been discussed in the Report of the Sub-Committee of the Standing Nursing Advisory Committee on relieving nurses of non-nursing duties in general and maternity hospitals (1968). Care should be taken to ensure that there is available an adequate domestic and portering service.
7·15. Where the nursing staff of the special care nursery is included in the overall staffing of the maternity department there is a risk that nursery staff may be allocated elsewhere in the department at times of need. So that the work of the nursery should not suffer, we strongly recommend that it should be recognized as having its own trained nurse staffing establishment.
7·16. Courses of training for special care should be organized and conducted so as to conform with national standards and this is within the scope of the Joint Board of Clinical Nursing Studies. Whilst the majority of training will take place in special care nurseries, some experience in an intensive care nursery is essential.
7·17. The staff of the special care nursery should not be involved in the bulk preparation of infant feeds.

8. SPECIAL CARE NURSERIES

8·1. *Siting of nurseries.* Both special care and intensive care nurseries should be provided in general hospitals which have specialist maternity and children's departments. In hospitals undertaking neonatal surgery there might be benefit if planning would allow the special care nursery and that for neonatal surgery to be near enough to share common facilities and skills, but allowing sufficient separation to prevent spread of infection.
8·2. *Cot provision and size of nurseries.* The Report of the Central Health Services Council (1961) recommended the provision of six special care cots per 1,000 livebirths and at least twenty cots in a unit.

8·3. Appendix 9 gives details of national statistical material and of information sought from selected nurseries which the Group used to estimate present cot needs. Both sources produced similar results, indicating that six cots per 1,000 livebirths are sufficient to meet all needs.

8·4. As all admissions to special care nurseries are emergencies, cots must always be available. Because of wide variation from time to time in the work load of special care nurseries it is essential that there should be enough cots to meet the peaks. On the other hand, both the length of average stay and the percentage occupancy rates have fallen in recent years. It is considered in the light of the available evidence that the provision of six cots per 1,000 livebirths should continue to suffice. This ratio can only be used as a guide and should not be applied rigidly. In estimating the number of cots for an area it is essential to take account of such factors as local population density, the birth rate, social class distribution and the incidence of low birth weight babies.

8·5. It has been estimated that of the total special care cots in England and Wales about 320 will be required for the function of intensive care. The assumptions on which intensive care cot provision is estimated are (a) that 50% of the live newborn babies having a birth weight of less than 1,500 g will need intensive care, (b) that an equal number of babies with birth weights over 1,500 g will need intensive care, (c) that the average duration of stay will be fifteen days and, (d) an occupancy rate of 70%–75%. Nurseries providing intensive care will undertake a local special care function; the cot provision for intensive care within these nurseries will depend on geographical and other circumstances, and to some extent on individual interest.

8·6. The Group deplores the continuation of small special care nurseries (Appendix 1, Table A1.7B) and recommends that only one nursery with a minimum size of 24 cots should normally be provided for a population of 250,000.

Design and equipment of nurseries

8·7. It is not the purpose of this report to define precise details of design or equipment but certain principles are stated. In general flexible design of special care nursery areas is desirable to allow ready adaptation to meet changes in demand.

8·8. *Number of cots per room and room size.* Babies requiring continuous observation should be congregated in one room of the nursery because of reasons of economy in nursing staff and equipment. This room would normally have six to eight cots or incubators and it should have equipment such as a resuscitation trolley and special monitoring facilities. More than one room in the nursery should be designed to serve this function, in case the usual room requires to be closed for cleaning. At least two single isolation cubicles should be provided. The desired total cot complement of the nursery can be made up in an additional room or rooms of four to six cots. In small rooms, about 50 sq ft per cot or incubator is desirable, but in large rooms 40 sq ft per cot should be adequate. The areas allocated do not take account of the extra space needed where mothers participate in the nursing care of their babies.

8·9. *Ease of observation.* Unimpeded vision between all working areas, including the isolation cubicles and the central nurses station, is essential. Glazed panelling extending below the height level of a cot, i.e. to within 2 ft. 6 ins (76·2 cms) from the floor should be provided in all interior walls.

8·10. *Temperature.* Heat regulation should be provided whereby a room temperature between 24° C (75° F) and 30° C (86° F) can be chosen by the staff and held at this level. (Temperatures higher than 27° C (80·5° F) will not be required except in nurseries where cot nursing of very small babies of 1,500 g or less is envisaged.) It is desirable that the temperature control of all rooms should operate independently to enable adjustment to suit the needs of individual babies. The siting of the nursery and the design of the windows should be such as to avoid excessive solar gain from direct sunshine.

8·11. *Cross infection.* Floors and walls should be of a material that is easily washed and disinfected, and constructed in such a way that all unnecessary crevices, ledges and inaccessible corners are eliminated, and services and piping should be covered. Devices to reduce handling of possibly contaminated surfaces should be used, such as pedal bins and elbow operated taps.

8·12. *The design chosen for the physical lay-out of the unit* is necessarily a compromise between reducing traffic to a minimum to prevent infection and cross-infection, and allowing proper access to those concerned with the infant. The latter will include not only medical, nursing and technical staff but also professional visitors (including medical students), and the baby's parents. The compromise is likely to vary from nursery to nursery as techniques and policies change with growing knowledge. In the design all these factors must be given fair consideration. For some nurseries a "clean" and "dirty" corridor system may be preferred.

8·13. *Services.* Piped oxygen is necessary, and piped compressed air and piped suction are desirable in all areas where babies are nursed. Ample power points should be provided; each cot station should be supplied with electric outlets. Lighting and decorating should be such that important clinical signs such as cyanosis, jaundice and pallor are not distorted. In general the intensity of illumination should be high and facilities for supplementing lighting should be available in the area where the most seriously ill babies are nursed. There should be an option to reduce light to "night light" intensity at night.

8·14. *Communications.* Facilities for summoning aid in an emergency should be available wherever babies are nursed. The essential features of such a facility should be simplicity and reliability. Telephones and/or intercommunication systems should be sited to reduce unnecessary traffic and to enable a nurse to answer all calls without leaving her charges.

8·15. *Ancillary rooms.* The usual ancillary rooms required will normally include clean and dirty utility rooms, a treatment room, staff pantry, linen room, generous nurses' and doctors' changing rooms with lockers, sister's office, doctor's office, cleaners' room, and a milk pantry (where feeds are stored immediately before use). The area for bulk preparation of feeds should not be situated within the special care nursery. A generous allowance is needed for storing equipment and C.S.S.D. supplies.

8·16. *Mothers' rooms.* Single rooms for resident mothers together with day room facilities should be provided. In some cases these rooms might be shared with the adjacent maternity department. Although it adds to the work load of the nursing staff, mothers should be encouraged to participate in the nursing care of their babies to the fullest possible extent.

8·17. *Demonstration and teaching rooms.* An important function of such nurseries will be the training of staff and the education of mothers: at least one room should be provided for these purposes.

8·18. *Equipment.* In general the equipment needed can be classified as that which is used for monitoring vital signs and that which is used therapeutically. All special care nurseries will need some monitoring equipment, e.g. oxygen analysers, thermometers, apnoea monitors and some therapeutic equipment, e.g. resuscitation equipment, transfusion sets. The amount and type of the equipment will vary with the degree of intensive care undertaken and the expertise of the staff to use it. The nursery providing intensive care will require, for example, heart rate monitors, pressure transducers and ventilators.

8·19. *Facilities.* Facilities for X-rays, biochemistry and blood gas analysis will be needed by all special and intensive care nurseries. (See also paragraph 5·25–5·27.)

9. SUMMARY

9·1. The report reviews the development of special care for babies from simple management in the early years to the modern service which provides an intensive care element in some special care nurseries. Evidence is quoted which suggests that modern intensive care not only would reduce perinatal mortality still further but also would reduce handicaps among surviving babies. The deficiencies of the existing special care services are examined. The report considers the organizational aspects of an area special care service based on the general hospital having maternity and children's departments and in particular the full participation and co-ordination of hospital, general practitioner and local authority services.

9·2. The functions of special care nurseries and those where intensive care is provided are defined. Guidance is given on the number of special care, including intensive care, cots which are required. The medical and nursing staffing needs of special care nurseries and intensive care nurseries are discussed. The report given special attention to follow-up, the regular review of perinatal mortality and morbidity, and to research.

The main recommendations are:

SECTION I—INTRODUCTION

9·3. The term low birth weight babies should replace that of "premature" babies (paragraph 1·2).

SECTION II—BRIEF HISTORICAL REVIEW

9·4. The existing special care service for babies should be re-organized to take account of important recent advances which not only save infant lives but improve their chances of developing normally (paragraph 2·7).

SECTION III—THE IMPORTANCE OF SPECIAL CARE

9·5. Attention should be directed not only to the reduction of perinatal mortality but also to the reduction of handicaps among surviving babies (paragraphs 3·7–3·11).

SECTION IV—PRESENT FACILITIES FOR SPECIAL CARE BABIES

9·6. Deficiencies in the existing special care service should be remedied (paragraph 4·3).

SECTION V—FUTURE ORGANIZATION OF SPECIAL CARE FOR BABIES

GENERAL

9·7. A special care service for newborn babies should comprise, anticipation and prevention of damage to the baby before and during birth, specialized observation and treatment for newborn babies, teaching and training of professional staff, follow-up and research (paragraph 5·1).

9·8. The special care service for the area should be based on the specialist maternity and children's department of the general hospital (paragraph 5·2).

9·9. The consultant paediatrician should have primary responsibility for the special care service and should work closely with the obstetric team (paragraph 5·3).

9·10. Area maternity liaison committees should formulate a plan to prevent or anticipate complications in the antenatal period (paragraph 5·5).

9·11. The general practitioner should not be penalised financially on account of seeking consultant help for his booked maternity patients (paragraph 5·5).

RESUSCITATION OF THE BABY

9·12. Written instructions detailing individual responsibility should be issued to all concerned with resuscitation of the baby (paragraph 5·9).

9·13. Obstetric and paediatric staff in training should be given the opportunity to become proficient in neonatal intubation (paragraph 5·8).

9·14. Midwives should be trained in resuscitation (paragraph 5·8).

INTENSIVE CARE

9·15. Intensive care facilities should be provided for a small proportion of babies such as those with severe respiratory problems or those who are born very early (paragraph 5·12).

TYPES OF NURSERIES

9·16. Two types of nurseries should be provided: (a) special care nurseries associated with specialist maternity departments of general hospitals, (b) combined special and intensive care nurseries associated with certain specialist maternity departments of general hospitals (paragraphs 1·5, 5·11–5·13).

TRANSPORT OF BABIES

9·17. Nurseries providing intensive care should be responsible for organizing the transport of babies to the nursery (paragraph 5·19).

MEDICAL RECORDS

9·18. Babies receiving special care should have individual case records which should also bear the mother's case registration number (paragraph 5·21).

9·19. The Advisory Committee on Hospital Medical Records should be asked to consider records for special care babies (paragraph 5·21).

LABORATORY SERVICE

9·20. Effective laboratory support should be provided for special care work at all levels (paragraph 5·25).

OBSERVATION

9·21. Some facilities for observation of newborn babies should be provided in small maternity units not having formal special care arrangements (paragraph 5·29).

FOLLOW-UP

9·22. A well co-ordinated follow-up scheme should be organized in each area (paragraph 5·30).

9·23. Regular reviews of perinatal mortality and morbidity should be carried out so that avoidable factors can be defined (paragraph 5·32).

SECTION VI—RESEARCH

9·24. Further research into the prevention of low birth weight and illness in newborn babies should be supported (paragraphs 6·2–6·4).

SECTION VII—STAFFING OF SPECIAL CARE NURSERIES

MEDICAL STAFFING

9·25. The special care nursery should form, for medical staffing purposes, an integral part of the children's department of the hospital (paragraph 7·1).

9·26. Consideration should be given to the need for appropriate training posts to meet the demands of new developments in neonatal medicine (paragraph 7·2).

9·27. In addition to two consultant paediatricians the primary duty of one member of the resident paediatric staff of the children's department should be the care of the neonate in the special care nursery (paragraph 7·3).

9·28. Intensive care nurseries should have, in addition to two or more consultant paediatricians and registrar staff, three resident paediatric staff engaged solely in neonatal work, plus an additional resident attached to the sick children's wards who would be available for cover (paragraph 7·4).

9·29. Special care nurseries provided in relation to maternity departments remote from children's departments should be replaced (paragraph 7·5).

9·30. The position of the single-handed consultant paediatrician engaged in special care work should be remedied as a matter of urgency (paragraph 7·6).

NURSE STAFFING

9·31. The nurse in overall charge of a special care nursery should be a registered nurse (S.R.N. or S.R.C.N.) or midwife and should be trained in special care work (paragraph 7·9).

9·32. Two experienced nurses able to resuscitate the baby should be on duty in each shift (paragraph 7·9).

9·33. Nurse staffing ratios should be flexible because of the wide variation of activity between nurseries (paragraph 7·10).

9·34. Non-nursing duties in special care nurseries should be delegated (paragraph 7·14).

9·35. The special care nursery should have its own trained nurse staffing establishment (paragraph 7·15).

9·36. The staff of special care nurseries should not be involved in the bulk preparation of infant feeds (paragraph 7·17).

SECTION VIII—SPECIAL CARE NURSERIES

NUMBER OF COTS AND SIZE OF NURSERY

9·37. As a tentative guide to planning, six special care cots should be provided per 1,000 live births (paragraph 8·4).

9·38. Of the total special care cots in England and Wales some 320 cots will be required for the function of intensive care (paragraph 8·5).

9·39. Normally only one nursery, with a minimum size of 24 cots, should be provided for a population of 250,000 (paragraph 8·6).

DESIGN AND EQUIPMENT OF NURSERIES

9·40. Design should be flexible to allow adaptation to meet changes in demand (paragraph 8·7).

9·41. Babies requiring continuous observation should be congregated in one room of the nursery which should have a resuscitation trolley and special monitoring equipment (paragraph 8·8).

9·42. Heat regulation should be provided whereby a selected room temperature can be chosen by the staff (paragraph 8·10).

9·43. Facilities for summoning aid in an emergency should be available in the nursery (paragraph 8·14).

9·44. Single rooms for resident mothers together with day facilities should be provided (paragraph 8·16).

This report was submitted at an early draft stage to the British Paediatric Association's Special Sub-Committee considering these problems. The Expert Group are grateful for the comments received from the Association.

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APPENDIX 1

TABLE A1.1

Analysis of notified "premature" live births by birth weight 1953–1969 in England and Wales

	–2 lbs 3 oz (–1,000 g)		–3 lbs 4 oz (–1,500 g)		–4 lbs 6 oz (–2,000 g)		–4 lbs 15 oz (–2,250 g)		–5 lbs 8 oz (–2,500 g)		All babies 5 lbs 8 oz (2,500 g) or less	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
1953		5,358	11·8		8,584	18·9	8,948	19·7	22,575	49·6	45,465	100
1954		5,193	11·3		8,451	18·4	9,074	19·7	23,300	50·6	46,018	100
1955		5,368	11·6		8,477	18·4	9,204	20·0	23,083	50·0	46,132	100
1956		5,455	11·5		8,711	18·3	9,705	20·4	23,641	49·8	47,512	100
1957		5,782	11·5		9,112	18·2	10,007	19·9	25,267	50·4	50,168	100
1958		5,661	11·2		9,228	18·2	10,160	20·0	25,693	50·6	50,742	100
1959		5,789	11·5		8,783	17·4	10,197	20·3	25,541	50·8	50,310	100
1960		5,970	11·3		9,503	18·1	10,599	20·1	26,561	50·5	52,633	100
1961		6,387	11·7		9,815	18·0	11,008	20·1	27,422	50·2	54,632	100
1962		6,387	11·7		9,797	17·5	11,520	20·6	28,403	50·7	55,999	100
*1963	2,319	4·1	4,031	7·2	10,160	18·1	11,917	21·2	27,745	49·4	56,172	100
1964	2,358	4·2	4,037	7·2	9,958	17·8	11,545	20·7	27,954	50·1	55,852	100
1965	2,202	4·0	3,785	6·9	9,756	17·8	11,209	20·5	27,791	50·8	54,743	100
1966	2,211	4·0	3,682	6·7	9,759	17·7	11,746	21·3	27,807	50·4	55,205	100
1967	2,004	3·7	3,743	6·9	9,492	17·6	11,300	21·0	27,265	50·7	53,804	100
1968	2,211	4·0	3,776	6·9	9,687	17·9	11,519	21·3	26,987	49·8	54,180	100
1969	2,058	3·9	3,570	6·7	9,484	17·7	11,707	21·9	26,587	49·8	53,406	100

Source: Department of Health and Social Security.
* Prior to 1963, separate figures were not collected for infants weighing less than 1,000 g.

TABLE A1.2

Infant mortality, early neonatal mortality, late neonatal mortality and post-neonatal mortality per 1,000 live births from 1906–10 to 1969, England and Wales

Period	Total Infant Mortality (under 1 year)	Early Neonatal Mortality (under 1 week)	Late Neonatal Mortality (1 week and under 4 weeks)	Post-neonatal Mortality (4 weeks and under 1 year)
1906–10	117·1	24·5	15·7	76·9
1911–15	108·7	24·1	14·9	69·8
1916–20	90·9	23·4	13·7	53·9
1921–25	74·9	21·7	11·7	41·6
1926–30	67·6	21·8	9·9	35·7
1931–35	61·9	22·4	9·0	30·5
1935–40	55·3	21·5	7·7	26·0
1941–45	49·8	18·7	7·2	23·8
1946–50	36·3	16·2	4·9	15·2
1951–55	26·9	15·0	3·0	8·9
1956	23·7	14·2	2·6	6·9
1957	23·1	14·1	2·4	6·7
1958	22·5	13·8	2·4	6·4
1959	22·2	13·6	2·3	6·3
1960	21·8	13·3	2·2	6·3
1961	21·4	13·3	2·1	6·1
1962	21·7	13·0	2·1	6·6
1963	21·1	12·3	2·0	6·9
1964	19·9	12·0	1·8	6·1
1965	19·0	11·3	1·7	6·0
1966	19·0	11·1	1·7	6·1
1967	18·3	10·7	1·8	5·8
1968	18·3	10·6	1·8	5·9
1969	18·0	10·2	1·8	6·0

Source: Office of Population Censuses and Surveys.

TABLE A1.3

Still birth rates, 1st-week mortality rates and perinatal mortality rates, 1928–1969, England and Wales

	Still Births per 1,000 Live and Still Births	1st-week Deaths per 1,000 Live Births	Perinatal Deaths per 1,000 Live and Still Births
1928	40·1	21·6	60·8
1929	40·0	22·3	61·4
1930	40·8	22·0	61·9
1931	40·9	22·1	62·1
1932	41·3	22·4	62·8
1933	41·4	22·9	63·4
1934	40·5	22·7	62·2
1935	40·7	22·0	61·9
1936	39·7	21·9	60·8
1937	39·0	22·0	60·2
1938	38·3	21·1	58·6
1939	38·1	21·2	58·5
1940	37·2	21·3	57·7
1941	34·8	20·7	54·7
1942	33·2	19·6	52·1
1943	30·1	18·3	47·9
1944	27·6	17·5	44·5
1945	27·6	18·0	45·2
1946	27·2	17·8	44·3
1947	24·1	16·5	40·3
1948	23·2	15·6	38·5
1949	22·7	15·6	38·0
1950	22·6	15·2	37·4
1951	23·0	15·5	38·2
1952	22·7	15·2	37·5
1953	22·4	14·8	36·9
1954	23·5	14·9	38·1
1955	23·2	14·6	37·4
1956	22·9	14·2	36·7
1957	22·5	14·1	36·2
1958	21·5	13·8	35·0
1959	20·8	13·6	34·1
1960	19·8	13·3	32·8
1961	19·0	13·3	32·0
1962	18·1	13·0	30·8
1963	17·2	12·3	29·3
1964	16·3	12·0	28·2
1965	15·8	11·3	26·9
1966	15·3	11·1	26·3
1967	14·8	10·7	25·4
1968	14·3	10·6	24·7
1969	13·2	10·2	23·4

Source: Office of Population Censuses and Surveys.

TABLE A1.4

Perinatal mortality and perinatal mortality rates 1958–1969, England and Wales

	(a) No. of stillbirths and deaths of infants under 1 week	(b) No. at (a) per 1,000 live and stillbirth occurrences
1958	26,502	35·0
1959	26,070	34·1
1960	26,292	32·8
1961	26,495	32·0
1962	26,352	30·8
1963	25,487	29·3
1964	25,083	28·2
1965	23,573	26·9
1966	22,689	26·3
1967	21,473	25·4
1968	20,530	24·7
1969	18,891	23·4

Source: Office of Population Censuses and Surveys.

TABLE A1.5

Perinatal mortality rates by Regional Board area in England and Wales by Quarter of the year—1968 and 1969

Regional Board Area	1968				1969			
	March	June	Sept	Dec	March	June	Sept	Dec
Newcastle	26·9	24·1	23·5	24·9	25·4	26·2	23·9	24·2
Leeds	26·4	25·9	25·2	26·7	24·8	24·4	26·9	26·7
Sheffield	26·3	25·0	25·2	25·0	21·7	23·9	24·3	24·3
East Anglian	24·0	21·4	19·5	20·3	19·5	20·3	19·7	19·7
N. W. Metropolitan ..	24·3	24·2	23·8	24·2	22·6	18·2	21·1	20·8
N. E. Metropolitan ..	24·9	22·5	23·3	24·0	21·5	21·0	20·5	24·4
S. E. Metropolitan ..	23·0	21·7	21·6	25·1	20·9	22·0	19·3	19·5
S. W. Metropolitan ..	21·9	22·9	23·7	22·7	22·2	19·2	19·6	25·8
Wessex	22·2	25·7	19·3	24·0	20·9	18·0	18·4	25·3
Oxford	21·0	18·8	22·7	19·6	18·3	18·0	19·9	22·9
South Western	23·7	22·3	20·9	21·8	22·2	20·0	20·1	24·6
Wales	28·7	27·6	25·7	27·9	27·4	26·5	26·6	27·0
Birmingham	23·6	24·8	26·4	25·8	25·5	24·4	23·4	24·9
Manchester	28·5	28·4	27·4	29·4	26·1	27·2	26·4	30·5
Liverpool	27·4	27·0	28·4	28·9	26·0	27·1	26·4	27·5

Source: Office of Population Censuses and Surveys

TABLE A1.6

Infant mortality rates per 1,000 live births for principal prenatal and natal causes including immaturity—England and Wales

I.C.D. (7th Revision)		Mortality per 1,000 livebirths		
		1965	1966	1967
760	Intracranial and spinal injury at birth	1·48	1·36	1·29
761	Other birth injury	0·62	0·55	0·52
762	Postnatal asphyxia and atelectasis	2·70	2·83	2·73
769	Attributed to maternal toxaemia	0·24	0·19	0·21
770	Erythroblastosis	0·36	0·37	0·36
771	Haemorrhagic disease of the newborn	0·19	0·23	0·21
774, 776	Immaturity alone, or primary to disease other than that of early infancy	2·93	2·90	2·72
760–5–773–5	Immaturity associated with diseases of early infancy	3·66	3·83	3·65
750–759	Congenital malformations	3·90	3·80	3·79

Source: Office of Population Censuses and Surveys

TABLE A1.7A

Number of special care baby cots per 1,000 live births by Regional Board Area in 1969 – England and Wales

Regional Board Area	Number of cots	Number of livebirths	Number of cots per 1,000 livebirths
England and Wales ..	3,440	797,538	4·3
Newcastle	317	48,578	6·5
Leeds	222	53,657	4·1
Sheffield	282	78,994	3·6
East Anglian	108	27,599	3·9
N. W. Metropolitan ..	297	69,701	4·3
N. E. Metropolitan ..	198	53,753	3·7
S. E. Metropolitan ..	202	52,264	3·9
S. W. Metropolitan ..	201	50,125	4·0
Oxford	183	34,480	5·3
South Western ..	210	47,928	4·4
Wales	225	43,082	5·2
Birmingham	376	91,221	4·1
Manchester	323	76,344	4·2
Liverpool	182	38,430	4·7
Wessex	114	31,382	3·6

These figures include teaching hospitals.
Sources: Department of Health and Social Security.
Office of Population Censuses and Surveys.

TABLE A1.7B

Special care baby nurseries at 31 December 1968

Region	Number of nurseries (number of allocated cots)						Total
	1–4 cots	5–9 cots	10–14 cots	15–19 cots	20–23 cots	24 cots and over	
Newcastle	3 (10)	1 (8)	9 (112)	4 (64)	1 (23)	2 (56)	20 (273)
Leeds..	2 (3)	4 (27)	6 (70)	3 (49)	Nil	2 (49)	17 (198)
Sheffield	2 (7)	5 (37)	3 (36)	6 (104)	2 (40)	1 (28)	19 (252)
East Anglian ..	2 (6)	4 (29)	2 (25)	Nil	1 (22)	Nil	9 (82)
N. W. Metropolitan	Nil	4 (30)	5 (66)	6 (96)	1 (20)	Nil	16 (212)
N. E. Metropolitan ..	5 (13)	8 (55)	3 (33)	3 (50)	1 (20)	Nil	20 (171)
S. E. Metropolitan ..	4 (10)	8 (52)	6 (70)	1 (15)	1 (20)	1 (25)	21 (192)
S. W. Metropolitan ..	2 (8)	4 (27)	5 (61)	3 (50)	Nil	Nil	14 (146)
Oxford	Nil	2 (17)	1 (12)	1 (15)	Nil	3 (105)	7 (149)
South Western ..	2 (3)	2 (14)	1 (12)	1 (15)	3 (60)	3 (92)	12 (196)
Wales	2 (3)	3 (25)	3 (34)	3 (53)	Nil	3 (94)	14 (209)
Birmingham	3 (8)	3 (18)	7 (80)	1 (17)	2 (44)	5 (160)	21 (327)
Manchester	3 (7)	3 (19)	8 (94)	5 (81)	2 (41)	2 (61)	23 (303)
Liverpool	4 (11)	3 (20)	4 (46)	1 (18)	1 (20)	2 (72)	15 (187)
Wessex	1 (4)	1 (6)	1 (12)	2 (31)	Nil	2 (55)	7 (108)
Provincial teaching ..	Nil	Nil	Nil	7 (119)	1 (20)	3 (86)	11 (225)
London under graduate	1 (4)	3 (26)	2 (25)	2 (34)	1 (20)	Nil	9 (109)
London post graduate	Nil	Nil	1 (10)	Nil	1 (20)	Nil	2 (30)
Total	36 (97)	58 (410)	67 (798)	49 (811)	18 (370)	29 (883)	257 (3,369)

Source: Department of Health and Social Security.

APPENDIX 2

Comparison of mortality rates by facilities for neonatal care, Province of Quebec, 1967*

Type of Hospital	No of Hospitals	No of Births	Incidence of Low Birth Weight (1,001-2,500 gm) (%)	Neonatal Mortality Rate			Stillbirth Rate (per 1,000)	Perinatal Mortality Rate (per 1,000)
				Low Birth Weight (%)	Over 2,500 gm (per 1,000)	Total (per 1,000)		
A. Metropolitan, with intramural neonatal intensive care facilities	3	6,259	6·80	5·47	2·77	6·30	10·21	16·5
B. Metropolitan, utilizing referral neonatal intensive care facilities	6	10,015	7·40	8·45	2·29	8·48	10·09	18·5
C. Metropolitan, without intramural or referral neonatal intensive care facilities	22	38,061	7·08	8·93	3·95	10·20	10·82	20·9
D. Non-metropolitan without intramural or referral neonatal intensive care facilities	5	7,403	6·64	13·20	4·84	13·69	12·69	26·2
TOTAL	36	61,738	7·05	9·00	3·67	9·55	10·86	20·7

* Hospitals delivering more than 1,000 infants per year. Infants weighing less than 1,000 gm are excluded.
Source: Usher 1970.

APPENDIX 3

Quality of Survivors of Certain Severe Perinatal Problems

(Nursed in Special Care Nursery, Princess Mary Maternity Hospital, Newcastle upon Tyne, 1961–69, and followed to a mean age of 4 years in November 1970)

Perinatal Problem	*No. of Survivors*	*Assessment*	
		Normal	*Abnormal or Doubtful*
Birth weight 1,360 (3 lb) or less*	44	35 (80%)	9
Regular respirations delayed 20 minutes or more	19	13 (68%)	6
Cardiac arrest	20	15 (75%)	5
Convulsions	59	48 (81%)	11
Hypoglycaemia	37	33 (89%)	4

Since some children had experienced more than one of these severe perinatal problems, the above 179 "survivors" represent 152 children, of whom 124 (82%) were assessed as normal and 28 (18%) as abnormal or doubtful at their latest examination.

* Note: subdivision of this very low birth weight group into two subgroups gives a more informative picture:

(a) Birth weight 1,000 g (2 lb 3 oz) or less:
Of those born alive, 9% survived (all since 1964).
Of the 8 survivors followed to a mean age of 2·7 years to date, 7 were normal and 1 abnormal (probable mental retardation at age of 2·25 years).

(b) Birth weight more than 1,000 g (2 lb 3 oz):
Of those born alive, 49·5% survived.
Of the 36 survivors followed to a mean age of 4·8 years to date, 28 (78%) were normal and 8 abnormal or doubtful:
1 dyslexia
1 language delay (? environmental cause)
1 language delay and I.Q. 79
1 severe deafness and I.Q. 80, in school and partially deaf
1 mental retardation, I.Q. 69, suitable for E.S.N. school
1 spastic paraplegia and I.Q. 82, in school for cerebral palsy
1 spastic monoplegia with epilepsy
1 defective vision due to myopia

Source: Neligan and Steiner, 1970.

APPENDIX 4

Follow-up of 67 Surviving Babies Among 149 Babies 1,500 g (3 lbs 4 oz) or Less Admitted to the Special Care Nursery at University College Hospital, London 1966–1969

Total number of babies followed up to November 1970		67*
Assessed aged 3 or 4 years		
by I.Q. testing (one abroad)	16	
Reports from abroad	3	
Assessed aged less than 3 years		
by D.Q. testing	47	
Reports from abroad	1	
Normal physical and mental development		58 (87%)
Doubtful mental development		5 (7%)
Abnormal physical development	2	4 (6%)
Abnormal physical and doubtful mental development	1	
Abnormal physical and mental development ...	1	

* Five of the 67 babies are living abroad.
Source: Rawlings and others (1971).

APPENDIX 5

Extract From a Memorandum on Antenatal Care Used in One Local Area

THE HIGH RISK CASE

High risk cases requiring hospital confinement have been defined in the perinatal mortality survey and in subsequent studies. While it is realized that, because of certain factors, not every high risk case will have a hospital confinement it is essential that all cases of high risk should be recognized and presented for hospital confinement wherever possible. Such cases can be broadly divided into two categories.

ABSOLUTE INDICATIONS FOR REFERRING TO HOSPITAL

1. Primigravidae over 30.
2. *All* Rhesus negative primigravidae.
3. Immediate previous stillbirth.
4. Previous gross congenital malformation.
5. Previous A.P.H. or P.P.H. or manual removal of placenta.
6. Previous Caesarean section or myomectomy.
7. Immediate previous difficult forceps delivery.
8. Multiple pregnancy.
9. Persistent breech, transverse or oblique lie.
10. Anaemia not responsive to treatment.
11. Multiparae over 40.
12. Para IV and over.

13. Two immediate previous miscarriages or history of cervical incompetence.
14. Bleeding in pregnancy; threatened abortion or antepartum haemorrhage.
15. Pre-eclamptic toxaemia. Essential hypertension. Eclampsia.
16. Rhesus or A.B.O. sensitization.
17. Long history of infertility; investigated infertility.
18. Maternal illnesses complicating pregnancy, e.g. heart disease, renal disease, asthma, epilepsy, diabetes, virus diseases.
19. Small stature.
20. Evidence of possible disproportion, e.g. high head in primigravidae at 38 weeks.
21. "Small for dates" baby in current pregnancy or immediate previous pregnancy.
22. Polyhydramnios, oligohydramnios, suspected fetal abnormality.
23. Premature labour before 37 weeks.
24. Post-maturity beyond 12 days.
25. Pyelonephritis in current pregnancy.
26. Previous 3rd degree tear: previous pelvic floor repair.
27. Maternal age under 17.

RELATIVE INDICATIONS FOR REFERRING TO HOSPITAL

1. All primigravidae.
2. All unmarried mothers.
3. Family history of hereditary or familial abnormalities.
4. Social class 5 mothers.
5. Hyperemesis, admitted in current pregnancy.
6. Patients in isolated rural areas.
7. Overweight patients.

These categories of absolute and relative indications should be considered as a general guide. There may be circumstances in which lack of accommodation at specialist units makes it impossible to book a woman late in pregnancy, although she is para IV or over. The same might apply to a young woman with secondary infertility. On the other hand, the relative indications, which will depend even more on bed capacity, will be strengthened by other factors.

APPENDIX 6

Suggestions Concerning the Nomenclature of Birth Weight and Gestational Age

On the evening of Tuesday, 7 April, 1970, an informal working party, consisting of obstetricians and paediatricians from thirteen European countries who were attending the Second European Congress of Perinatal Medicine, met and (after discussion) agreed to make the following suggestions:

(a) That there is a need to define the important groups of babies who present special clinical difficulties and have an increased perinatal mortality in simple words which straightforwardly reflect what can be measured, namely birth weight and gestational age (thus excluding all words incorporating "maturity", which cannot be measured as applied to a whole individual).

(b) That this should make it possible to apply to the intra-uterine phase of growth the same concepts as have long been applied to the study and definition of growth after birth.

(c) That the essential parameter is the gestational age calculated from the menstrual dates (and so perhaps better called menstrual age). Where reliable menstrual information is not available, and there is information about the date of ovulation, this can be used, by adding 14 days, to calculate the gestational age. This should then ideally be expressed in days, but if weeks are preferred they should be "completed weeks" (so that 40 weeks = 280–286 days). In presenting tables and graphs, both the days and the corresponding weeks should be stated. If no information is available it is not felt possible in the present state of knowledge to recommend any of the more technical methods of estimating the gestational age for general use.

(d) If it is considered useful (because of differences in mortality and morbidity) to group babies in terms of gestational age, the three groups and definitions suggested are:

(i) Pre-term: less than 259 days (37 weeks)
(ii) Term: 259–293 days (37–41 weeks)
(iii) Post-term: 294 days (42 weeks) or more

There was a considerable body of feeling in favour of placing the limit between pre-term and term 7 days (1 week) later, but the arguments in favour of this were not thought to outweigh the fact that 259 days is the official W.H.O. recommendation (Technical Report Series, No. 25, 1950).

(e) That birth weight is of some practical value in itself and when it is the only information available horizontal dividing lines of the traditional type may be useful—e.g. 2,500 g or less = "low birth weight", and sub-division by 500 g intervals may also be useful within this low birth weight group. Separate recording of babies with a birth weight of 1,000 g or less is in any case useful when making statistical comparisons.

(f) The usefulness of birth weight is much increased by relating it to the gestational age, and comparing the results with the known distribution in a defined population (e.g. a percentile chart relating birth weight to gestational age, preferably sex-specific and based upon the population from which the clinical material is drawn—but otherwise upon the best data available for purposes of comparison). The birth weight can then be expressed in appropriate phrases—e.g. "below 5th percentile for boys, Aberdeen 1968" (or "light-for-dates").

Source: Second European Congress of Perinatal Medicine: Developmental Medicine and Child Neurology 1970, 12, 384.
Acta Paediatrica Scandinavica 1970, 59, 480.
Archives of Disease in Childhood, 1970, 45, 730.

APPENDIX 7

Jefferson Davis Hospital Nursery Statistics
Corrected Neonatal Mortality Rates

Year	Term mortality	"Premature" mortality	Overall mortality
1954	0·53	13·27	2·14
1955	0·71	11·83	2·07
1956	0·43	12·67	1·96
1957	1·15	14·64	2·84
1958	0·91	10·12	2·18
1959	0·88	11·90	2·42
1960	0·39	6·82	1·19
1961	0·65	8·47	1·70
1962	0·41	8·69	1·56
1963	0·37	7·67	1·40
1964	0·39	9·90	1·59
1965	0·36	6·76	1·32
1966	0·52	6·41	1·41
1967	0·34	5·49	1·04

(Special care facilities were introduced in 1960 which were accompanied by a marked fall in "premature" mortality.)
Source: Stahlman 1969.

APPENDIX 8

Hospital Medical Staff in the Specialties of Gynaecology & Obstetrics and Paediatrics* (England and Wales)

Analysis by grade showing whole time equivalent at 30 September 1968 and 1969

Grade	Gynaecology & Obstetrics		Paediatrics	
	1968	1969	1968	1969
All grades total	1,789·1	1,854·9	814·4	850·9
Consultant	436·3	455·0	224·2	231·7
S.H.M.O. with allowance ..	1·6	1·6	—	—
S.H.M.O. without allowance ..	5·8	4·2	1·0	1·0
Medical assistant	16·5	17·6	10·6	11·3
Senior registrar	79·0	82·8	34·5	35·4
Registrar	400·1	393·3	165·2	162·3
J.H.M.O.	2·0	—	2·0	2·0
S.H.O.	562·9	629·6	280·0	307·0
H.O. post and pre-registration ..	283·3	269·1	96·2	98·6
Other staff	1·6	1·6	0·7	1·6

* University Department staff not included.
Source: Department of Health and Social Security.

APPENDIX 9
Cot Provision

1. The Group used two methods to assess the requirement for special care cots, one involving certain national statistics and the other a detailed study of selected nurseries.

A. National Statistics

2. The national statistics were derived from official sources for 1969, refined by 1967 diagnostic detail. Morbidity was based on the Hospital Inpatient Enquiry for 1962 to 1967, updated to 1969 using the 1969 birth rate.

3. Babies requiring special care may be considered under 4 broad categories, namely:

(a) Babies born after difficult deliveries
(b) Low birth weight babies
(c) Sick babies treated in hospital
(d) Perinatal deaths

It has been necessary to correct the basic figures to take account of the substantial degree to which these categories overlap. For example, the majority (66%) of early neonatal deaths occurs among low birth weight babies, and the total number of babies in this group (d) has been reduced to avoid duplication. In addition certain diagnoses were excluded to allow for groups for whom special care is inappropriate. For example, most babies with congenital malformations were regarded as more suitable for surgical care. Annexe 1 Table A9.1 shows for 1969 the various groups with certain subdivisions and also indicates the various corrections made. The final column shows the various categories of babies that may require special care.

4. Difficult deliveries include Caesarean sections, forceps and breech deliveries. It was necessary to make some reduction in the figures to take account of babies suffering from congenital malformations, diseases of early infancy including immaturity, and those who were stillborn. The data derived from the Hospital Inpatient Enquiry for 1967 were adjusted using statistics from hospital births to provide an estimate for 1969 of some 84,000 (Annexe 1 Table A9.2).

5. Low birth weight babies were those notified in 1969 weighing 2,500 g or less; data from this source indicated the need to reduce the numbers of early neonatal deaths, a subgroup which became negligible when deaths due to congenital malformations or diseases of early infancy were also excluded. As the exercise was intended to produce an upper limit for special care cot needs, the majority (75% in 1969) of stillbirths was regarded as eligible; congenital abnormalities were mainly excluded, as were macerated stillbirths.

6. The Hospital Inpatient Enquiry for 1967 showed the extent to which children under 1 year received inpatient care, as indicated by spells assigned to disorders of early infancy, and also those assigned to congenital malformations of the heart. A substantial reduction was made (using coding detail) for low birth weight. Separate statistics are shown for infectious diseases of early infancy, since such babies would require special care, but in a section of the special care nursery separate from the main area (Annexe 2 Table A9.3).

7. Annexe 1 Table A9.1 indicates that in 1969 some 184,000 babies were estimated to require special care, 84,000 because of a difficult delivery, and the remaining 100,000 because of low birth weight or illness. The latter group represents more closely the babies cared for in special care nurseries. Application of the current

average stay of 10·9 days, and a bed occupancy of 73%, to the estimate of 100,000 babies indicates that some 4,000 cots are required, or 5·1 cots per 1,000 live births. A special study showed that at present babies born after difficult deliveries and without obvious illness or defect spend on average 3 days in certain special care nurseries, although in general such monitoring is not a routine procedure. Assuming that special care is necessary for all babies following difficult delivery and allowing an average stay of 3 days, some 940 cots, or 1·2 cots per 1,000 live births, are needed for such infants at the present occupancy level. Thus some 6·2 cots per 1,000 live births at most are needed to accommodate all infants needing special care.

8. Some indication of possible trends in special care for babies may be deduced from Annexe 3 Table A9.4, which presents data for 1962 and 1969, revealing that the number of babies treated increased by 19·3% from 157,000 to 184,000. In terms of live births, the rates increased by 23% from 187 to 231 per 1,000. Interesting changes can be seen; the number of low birth weight babies and stillbirths has decreased, whereas the number of difficult deliveries and sick babies has increased. Changes in clinical practice may to some extent have influenced these trends. Applying our previous assumptions, cot needs for 1962 would have been some 4,400, or 5·3 per 1,000 live births. Thus, apparently, special care cot requirements have increased since 1962, but about 6 cots per 1,000 live births should suffice for some years to come.

B. Detailed Study of Selected Nurseries

9. Eleven special care nurseries were asked to provide information of 12 months' experience (Annexe 4), which provided certain basic data on babies born in hospital, and of those admitted to special care nurseries. Such admissions were divided into 3 main groups:

(a) Infants born outside hospital
(b) Hospital births weighing 2,500 g or less
(c) Hospital births weighing more than 2,500 g

Provision was made for 7 broad subdivisions of babies in the last category, and details of duration of stay were also requested for the last 2 groups.

10. The survey returns were compared with the appropriate SH3* material (making due allowance for the returns that did not cover a calendar year) and found in general to be fairly similar, although 3 nurseries showed substantially fewer babies receiving special care than indicated on SH3, while in another the situation was reversed. Annexe 5 Table A9.5 shows the distribution of special care babies by the 3 broad categories and other statistics. The nurseries treated some 5,800 babies, 51% of whom were babies of more than 2,500 g born in hospital, 37% were babies of low birth weight born in hospital, while the remaining 12% were born elsewhere, the reasons for their admission being unknown. There were considerable differences in cot provision between the various nurseries, and also great variations in practice. Babies born outside the hospital accounted for about one-third of admissions at Exeter and Hammersmith, compared with a range of 1% to 17% in the remaining nurseries. In Gloucester babies of more than 2,500 g spent some 3 weeks in special care, while in the other nurseries the range was 3 to 10 days. Diagnostic data on babies weighing 2,500 g or more born in hospital is shown in Annexe 5 Table A9.6, although the value of this material is

* Hospital Service statistical return.

reduced by the fact that there was a large "not known" category. About one-tenth of these babies were born following a difficult delivery, but diseases of early infancy were assigned as the main cause for admission. Reasons for admission varied between nurseries.

11. Proportions derived from the study were applied to national statistics for 1969 indicating that some 130,000 babies required special care, assuming that the units represent ideal practice. Application of current usage data indicates that some 5,250 beds are needed or 6·6 beds per 1,000 live births, which accords closely with the more refined estimate derived from the statistical exercise described in A.

APPENDIX 9—ANNEXE 1

TABLE A9.1

Estimate of number of babies requiring special care in 1969
England and Wales

	I.C.D. (7th Revision)	All	Not suitable or included elsewhere		Suitable for special care
			Congenital abnormality	Other diseases	
All babies			1,945	659	183,989
(a) Difficult deliveries		(see Table A9.2)			84,478[1]
(b) Live births 2,500 g. or less ..		53,419			53,419
(c) Sick babies (other than those 2,500 g. or less at birth) ..					38,197
Sick babies	760–763, 769–773	(see Table A9.3)			31,197
Congenital malformations of heart	754	3,000			3,000
Perinatal infections ..	764–768	4,000			4,000
(d) Late fetal deaths		10,499	1,945[2]	659[3]	7,895

[1] Provisional
[2] Y.38
[3] Y.39.4 Maceration

Source: Hospital Inpatient Enquiry
Office of Population Censuses and Surveys

TABLE A9.2

Difficult deliveries—Hospital inpatient enquiry estimated figures 1967
England and Wales

	All	Categories not suitable or included elsewhere			Suitable for special care
		Mongolism, Clubfoot, Congenital Malformations (I.C.D. 325·4, 748, 759)	Other diseases of early infancy [760–776]	Still births	
Caesarean [op. Codes 764–769]	33,118	977	6,674	406	25,060
Forceps [op. Codes 754–758]	66,301	1,899	10,285	1,065	53,052
Breech [op. Code 762]	3,820	—	—	—	3,820
Totals	103,239	2,876	16,959	1,471	81,932

Estimate for 1969:

$$\frac{647{,}569 \text{ Total babies born in hospital 1969}}{628{,}052 \text{ Total babies born in hospital 1967}} \times 81{,}932 = 84{,}478$$

APPENDIX 9—ANNEXE 2

TABLE A9.3

Hospital inpatient enquiry: estimated number of inpatient spells for babies aged under 1 year, by diagnosis in 1967—England and Wales

I.C.D.	Diagnosis	Estimated number of spells	Estimated number of spells without immaturity	Estimated number of spells with immaturity
	Congenital malformations	16,015	Not available	Not available
750	Monstrosity	66		
751	Spina bifida and meningocele	2,129		
752	Congenital hydrocephalus	966		
753	Other congenital malformations of the nervous system and sense organs ..	637		
754	Congenital malformations of the circulatory system	2,876		
755	Cleft palate and harelip..	1,449		
756	Congenital malformations of the digestive system	4,347		
757	Congenital malformations of the genito urinary system	724		
758	Congenital malformation of the bone and joint	460		
759	Other and unspecified congenital malformations	1,361		
	Certain diseases of early infancy ..	58,617	31,581	27,036
760	Intracranial and spinal injury at birth ..	1,350	1,032	318
761	Other birth injury	7,113	6,334	779
762	Postnatal atelectasis	3,655	2,382	1,273
770	Haemolytic disease of newborn (Erythroblastosis)	2,975	2,503	472
772	Nutritional maladjustment	6,191	5,938	253
763	Pneumonia of the newborn	1,833	1,690	143
764	Diarrhoea of the newborn	2,854	2,755	99
765	Ophthalmia neonatorum	571	538	33
766	Pemphigus neonatorum	33	33	—
767	Umbilical sepsis..	231	220	11
768	Other sepsis of the newborn	801	669	132
769	Neonatal disorders arising from certain diseases of the mother during pregnancy	253	110	143
771	Haemorrhagic disease of the newborn	626	593	33
773	Ill-defined diseases peculiar to early infancy	8,946	6,784	2,162
774	Immaturity with mention of any other subsidiary condition	439	—	439
776	Immaturity unqualified..	20,746	—	20,746

APPENDIX 9—ANNEXE 3

TABLE A9.4

Babies suitable for special care. 1962 compared with 1969. Numbers and percentages—England and Wales

	Suitable for special care			
	1962		1969	
	Estimated numbers	%	Estimated numbers	%
(a) Difficult deliveries ..	64,261[1]	41·0	84,478	45·9
(b) Live births 2,500 g or less	55,984	35·7	53,419	29·0
(c) Sick babies (other than those 2,500 g or less at birth)	24,986	15·9	38,197	20·8
(d) Late fetal deaths	11,610	7·4	7,895	4·3
Total	156,841	100·0	183,989	100·0

[1] 1962 figures corrected by 1963 figures for cases elsewhere included.

Sources: Department of Health and Social Security.
Office of Population Censuses and Surveys
Hospital Inpatient Enquiry.

APPENDIX 9—ANNEXE 4

1. Name of hospital:

2. Twelve month period:

3. % of deliveries in the maternity unit with which you are associated, related to total deliveries in your catchment area.

	Number	Duration of stay	
		*Median	Average
4. Deliveries in the hospital (a) liveborn			
(b) stillborn			
5. All babies liveborn in the hospital and weighing 2,500 g or less			
6. Cots in Special Care Baby Unit			
7. Babies *not* born in the hospital but admitted to Special Care Baby Unit			
8. Babies born in the hospital weighing 2,500 g or less admitted to Special Care Baby Unit			
9. Babies born in the hospital admitted to the Special Care Baby Unit other than those weighing 2,500 g or less			
10. Categories of babies included at 9, e.g. (a) Rhesus incompatibility .. .. ABO „			
(b) Congenital defects			
(c) Birth asphyxia			
(d) Born to diabetic mothers			
(e) Perinatal infection			
(f) Birth injury			
(g) Social			
Specify other categories.			

* Middle term of "duration of stay" when placed in ranking order.

APPENDIX 9—ANNEXE 5

TABLE A9.5

Distribution of special care babies cared for in selected units by three broad categories and other statistics

	Survey Number	%	National data 1969	%
Hospital deliveries (Live)	27,498	100	647,569(1)	100
Babies 2,500 g or less	2,447	8·9	53,419(1)	8·2
Babies more than 2,500 g	25,051	91·1	594,150(1)	91·8
All special care babies	5,822	100	129,753(2)	100
Born outside hospital	695	11·9	15,499(2)	11·9
Born in hospital 2,500 g or less	2,142	36·8	42,957(2)	33·1
Born in hospital over 2,500 g	2,985	51·3	71,340(2)	55·0

(1) Actual
(2) Estimated

TABLE A9.6

Distribution of 2,985 special care babies in selected units born in hospital and weighing more than 2,500 g

	Survey Number	%
(a) Rhesus incompatibility	284	9·5
(b) Congenital defects	188	6·3
(c) Birth asphyxia	493	16·5
(d) Born to diabetic mothers	67	2·2
(e) Perinatal infection	297	9·9
(f) Birth injury	269	9·0
(g) Social	26	0·9
(h) Respiratory problems	100	3·4
(i) Short gestation	85	2·8
(j) Difficult labour	353	11·8
(k) Other	177	5·7
(l) Not Known	646	21·9
ALL	2,985	100

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